

ANDREA PETRI

(917) · 969 · 7212 ◊ apetri@phys.columbia.edu
932 Pupin Hall ◊ 538 West 120th Street ◊ New York, NY 10027
<http://apetri.me>

EDUCATION

Columbia University, Graduate School of Arts and Sciences

PhD. Physics

M.Phil. Physics

M.A. Physics

Relevant coursework:

Advanced Programming Statistical Mechanics Quantum Mechanics

Physical Cosmology Classical Fields and Waves Quantum Field Theory

August 2011 - present

expected 2017

June 2014

June 2013

Scuola Normale Superiore, Classe di Scienze, Pisa, Italy

M.S. Physics

B.A. Physics

September 2006 - July 2011

July 2011

June 2009

RELEVANT EXPERIENCE

Software developer

Fall 2013 - Present

Columbia University, NY

- Developed the LensTools Python library, that will prove useful in Weak Gravitational Lensing data analyses, with particular focus on ray-tracing simulations, astrophysical image analysis, data reduction and statistical inferences of model parameters from observations (project URL <http://lenstools.rtfd.io>)
- Implemented from scratch the client and server side components of a three tier simple database service, using the C language socket API (code repository available on request)

Supercomputing

Spring 2014 - Present

Columbia University, NY

- Actively participated in a supercomputing research project on Cosmology from Non-Linear Weak Lensing at the Extreme Science and Engineering Discovery Environment (XSEDE, <https://www.xsede.org/active-xsede-allocations>), with more than 1.5 million CPU hours awarded
- Planned, directed and executed the production of a 30TB simulated dataset featuring lensed galaxy catalogs and Dark Matter density maps

Morgan Stanley - Institutional Equity Division

June 2015 - August 2015, June 2016 - August 2016

Electronic Market Making (EMM) desk

New York

- Analyzed impact of systematic risk exposure on EMM portfolios traded in US equity markets during 2015
- Developed back test and real time analysis software tools to monitor EMM portfolio risk exposure
- Analyzed stock market historical data, with particular focus on US equity market trades from 2009 to 2014
- Developed mathematical models and algorithms for intra-day volume forecasts

ACADEMIC EXPERIENCE

Research

Summer 2012 - Present

Astrophysics – Large Scale Structure of the Universe

Columbia University, NY

- Conducted statistical analysis of Cosmological Large Scale Structure simulated images, with particular emphasis on the development and implementation of new techniques to constrain physical model parameters
- Worked on Cosmic Microwave Background (CMB) data analysis, with particular focus on temperature image reconstruction starting from raw time ordered data (bolometric and pointing)
- Contributed to the development of CMB map-making software, implemented the corrections for pointing and calibration offsets
- Served as peer reviewer for the American Astronomical Society (AAS) and for the journal Monthly Notices of the Royal Astronomical Society (MNRAS)

Teaching

Fall 2012 - Present

Graduate student instructor

Columbia University, NY

- Co-recipient of the 2016 Allan M. Sachs Teaching Award for contributions to Columbia Physics educational programs

- Designed and taught as co-instructor a Modern Cosmology class aimed at high school students in the Columbia Science Honors Program (SHP)
- Taught several Physics Laboratory introductory courses aimed at pre-medical and engineering track students

TECHNICAL STRENGTHS

Mathematical tools	Linear algebra, bayesian statistics, image processing
Programming Languages	Python, C/C++, Fortran90, Bash, R
Protocols & APIs	Object Oriented Programming, Parallel Computing (MPI), TCP/IP sockets, HTTP
Databases	MySQL
Tools	Distributed source control (git, mercurial)